



First record of *Parasitus americanus* (Berlese, 1905) and *Cornigamasus ocliferius* Skorupski & Witaliński, 1997 (Acari: Mesostigmata: Parasitidae) from Slovakia

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Abstract

Two species of Parasitidae, *Parasitus americanus* (Berlese, 1905) and *Cornigamasus ocliferius* Skorupski & Witaliński, 1997 were found for the first time in Slovakia. *Parasitus americanus* is a cosmopolitan species, which was found in several cemeteries and in a botanic garden in Bratislava. Almost all records of *C. ocliferius* are from Poland except for one record from Egypt. *Cornigamasus ocliferius* was found in decomposed plant material in Western and Central Slovakia and in bird nests in Western and Eastern Slovakia; part of the material was previously published as *Cornigamasus lunaris* (Berlese, 1882) and is revised here.

Key words

Mites; new records; soil; compost; bird nest.

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Introduction

The mites of the family Parasitidae are free-living predators which can be found in soil habitats. Some genera of this family, for example *Parasitus* and *Cornigamasus*, frequently occur in ephemere habitats as compost, manure or decaying hay. The greatest diversity of the family Parasitidae is in the Palearctic, but several species are known from North America (Hennessey and Farrier 1989) and from the Southern Hemisphere (Karg and Schorlemmer 2009). The deutonymphs of *P. americanus* can be phoretic on insects, and this species seems to be very frequent in agricultural soil (Hyatt 1988). On the contrary, *C. ocliferius* is a very rare species with only a few known records, mostly from decaying hay.

Methods

The following material was examined:

***Parasitus americanus*:** Slovakia: Bratislava city, Vrakúňa cemetery, Podunajská rovina plain, 135 m, 48°08' N, 017°11' E, 11 June 2014, soil. Kocáková, M. [1 deutonymph (DN)]; *ibid.*, 30 October 2014, soil. Kocáková, M. [2♂ 1♀]; Bratislava city, Ondrejský cemetery, Podunajská rovina plain, 140 m, 48°09' N, 017°07' E, 5 July 2013, soil. Holecová, M. [1♀]; Bratislava city, Martinský cemetery, Podunajská rovina plain, 140 m, 48°09' N, 017°09' E, 30 October 2014, soil. Kocáková, M. [2♂ 2♀ 11DN]; Bratislava city, Cintorín pri Kozej bráne cemetery, Malé Karpaty Mts, 174 m, 48°08' N, 017°05' E, 17 September 2013, compost. Holecová, M. [1♂]; *ibid.*, 9 October 2014, soil. Kocáková, M. [1DN];

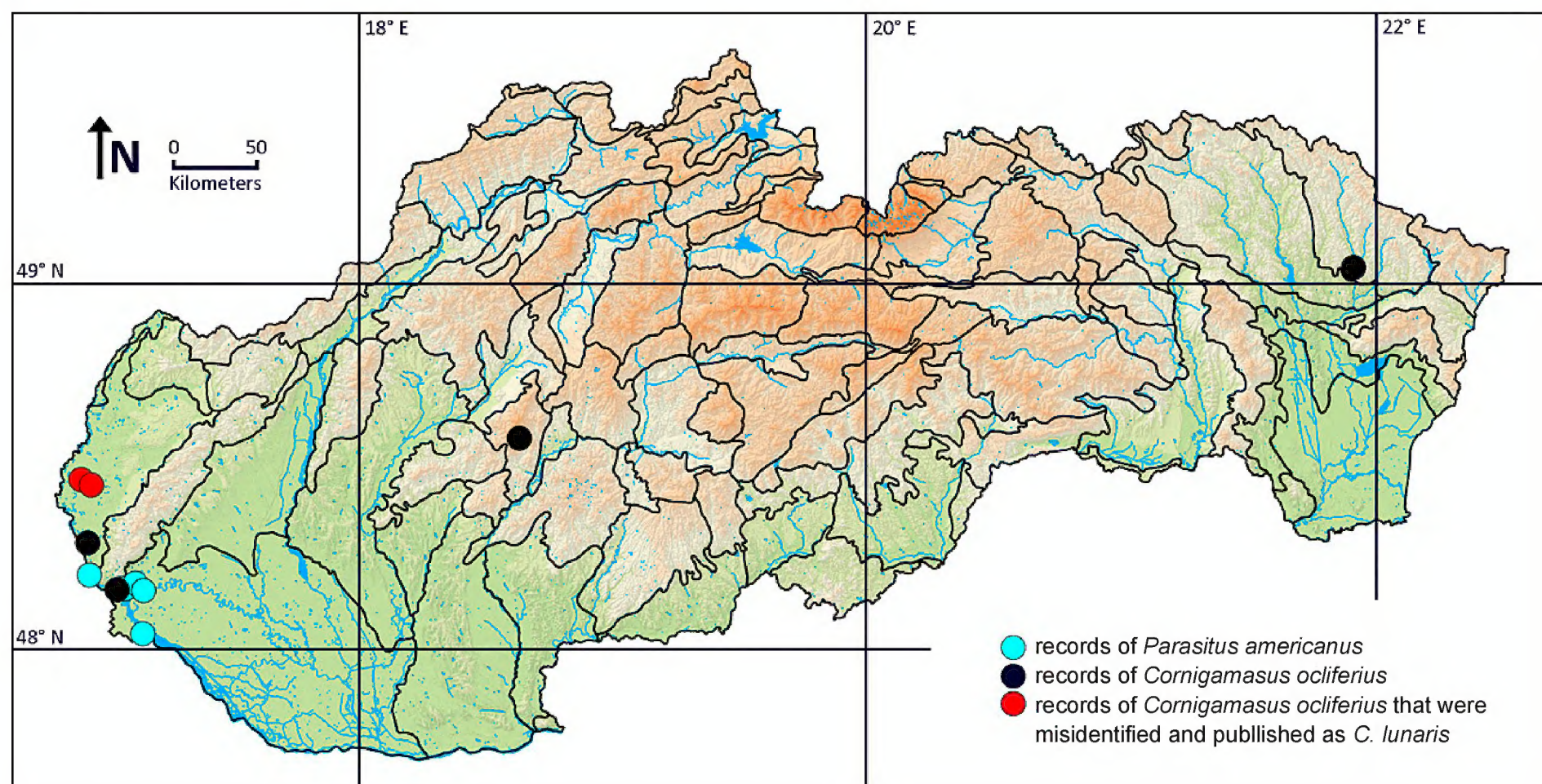


Figure 1. Map showing the distribution of *Parasitus americanus* and *Cornigamasus ocliferius* in Slovakia. Datum: WGS84.

Bratislava city, Mikulášsky cemetery, Malé Karpaty Mts, 170 m, 48°08' N, 017°05' E, 9 October 2014, compost. Kocáková, M. [2♀ 6DN]; Bratislava city, Botanic garden, Malé Karpaty Mts, 135 m, 48°08' N, 017°04' E, 28 April 2014, pitfall trap. Holecová, M. [1♀ 1DN]; ibid., 30 September 2014, pitfall trap. Holecová, M. [5♂ 2♀]; ibid., 29 October 2014, pitfall trap. Holecová, M. [4♂ 1♀]; Čunovo village, cemetery, Podunajská rovina plain, 130 m, 48°02' N, 17°11' E, 2 July 2013, soil. Holecová, M. [1DN]; ibid., 18 July 2014, soil. Kocáková, M. [6DN]; ibid., 30 October 2014, leaf litter. Kocáková, M. [4DN]; Devín village, cemetery, Borská rovina plain, 140 m, 48°12' N, 016°59' E, 2 July 2013, soil and leaf litter. Holecová, M. [1DN]; ibid., 10 June 2014, soil. Fend'a, P. [12DN]; ibid., 30 October 2014, soil and leaf litter. Kocáková, M. [1♂ 1♀ 23DN].

***Cornigamasus ocliferius*:** Slovakia: Koškovce village environment, Laborecká vrchovina highland, 280 m, 49°02' N, 021°56' E, 7 June 1998, nest of *Milvus milvus*. Sírýová, S. [1♀]; Devínske jazero village, Borská nížina lowland, 140 m, 48°15'44" N, 016°57'52" E, 15 August 2012, garden compost. Stloukalová, V. [3DN]; Kľak village, Vtáčnik Mts, 609 m, 48°34'59.41" N, 018°38'39.65" E, 12 May 2013, garden compost. Krajčovičová, K. [1♂ 9♀ 85DN]; Bratislava city, Mikulášsky cemetery, Malé Karpaty Mts, 170 m, 48°08' N, 017°05' E, 9 October 2014, compost. Kocáková, M. [1DN].

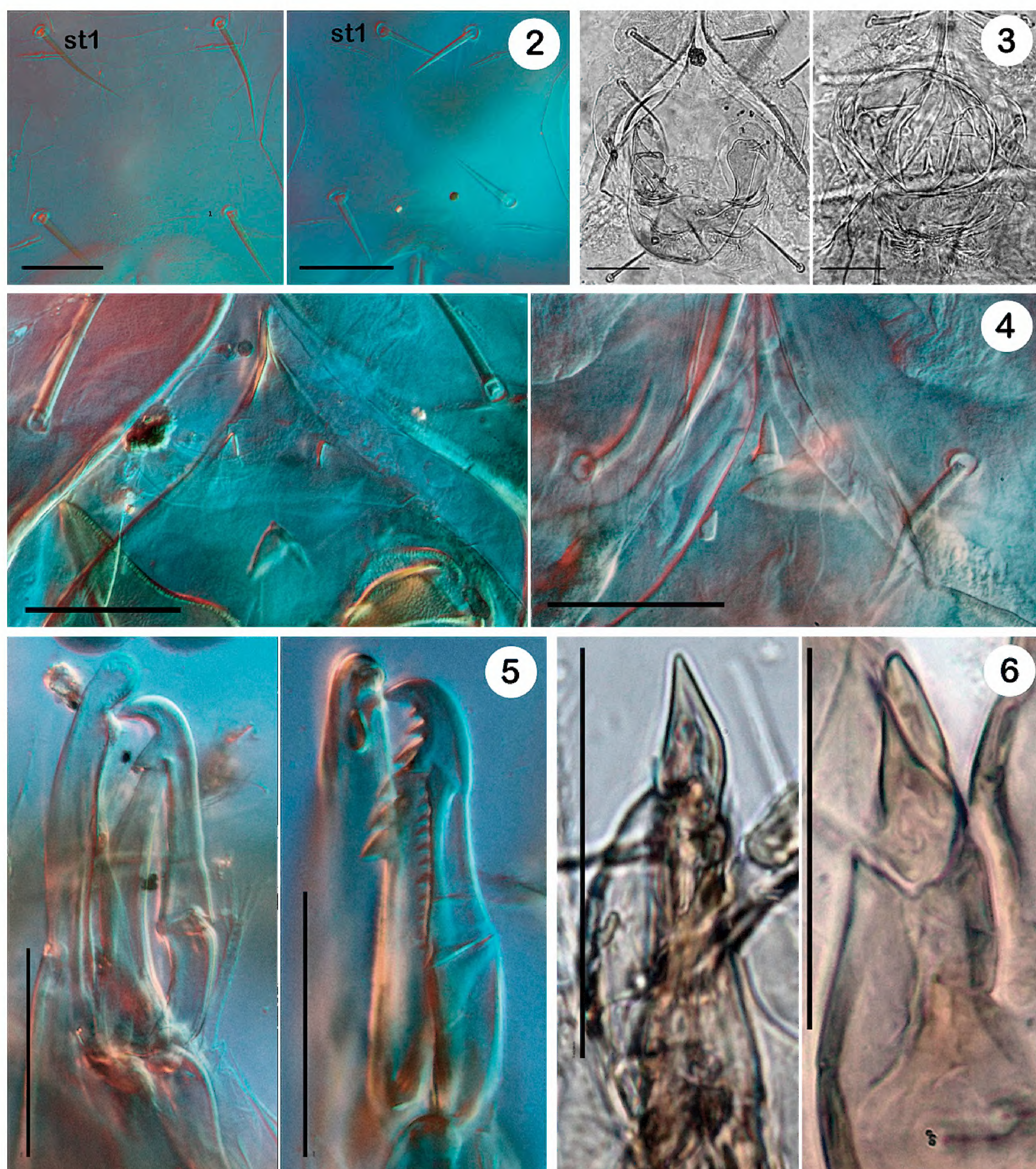
Some material studied was previously published by Fend'a and Schniererová (2005), as *C. lunaris*:

***Cornigamasus ocliferius*:** Stará Šutrovňa fishponds, Borská nížina lowland, 150 m, 48°25' N, 016°55' E, 10 May 1997, nest of *Anas platyrhynchos*. Fend'a, P. [3DN]; Jakubovské rybníky fishponds, Borská nížina lowland, 150 m, 48°24' N, 016°58' E, 25 May 1999, 2 wet nests of *Fulica atra*. Schniererová, E. [4DN].

Mites were collected from soil, leaf litter, bird nests and compost samples. For the studied localities see the map (Fig. 1). Mites were collected by 2 methods—substrate samples and pitfall traps. Pitfall traps consisted of a plastic cup (3 cm diameter × 8.5 cm deep) buried up to its rim in soil and partly filled with 10% formaldehyde. Traps were exposed from April to October 2014 and were emptied at monthly intervals. Mites were extracted from substrates to 70% ethylalcohol solution by Berlese-Tullgren funnels. Mites were separated from other soil arthropods collected using a Leica EZ4 stereomicroscope, and the material was processed to yield microslides using the chloralhydrate Swan's medium. Photographs were taken using a Leica DM 2500 compound microscope with a Canon EOS 70D Camera Module (EOS Utility v. 2.13.20.0). We used bright-field microscopy as well as DIC microscopy to take the photographs. Voucher specimens are deposited in the Slovak National Museum with catalog numbers SZ 10 885 and SZ 10 886 and in Acarological Collection in Department of Zoology, Faculty of Natural Sciences, Comenius University.

Results

Our specimens of *P. americanus* fit with the redescription by Hyatt (1988). This species is closely related to *Parasitus fimetorum* (Berlese, 1904) but the adults can be easily recognized according to following characters: the first pair of sternal setae of females is not closer to each other than second pair of sternal setae (Fig. 2), the form of the endogynium (Fig. 3), the epigynum bears near its apex a pair of small anteriorly directed teeth and 1 small secondary tip (Fig. 4), the movable digit of the male's chelicera bears only 1 big tooth (Fig. 5), and the corniculi of male are entire (Fig. 6). As noted



Figures 2–6. A comparison of *P. americanus* on the left side of each figure and *P. fimetorum* on the right. **2.** Sternal shield of female with sternal setae. **3.** Endonyum of female. **4.** Epigynum of female. **5.** Digitus mobilis of chelicera of male. **6.** Corniculi of male. Scale bars: 100 µm.

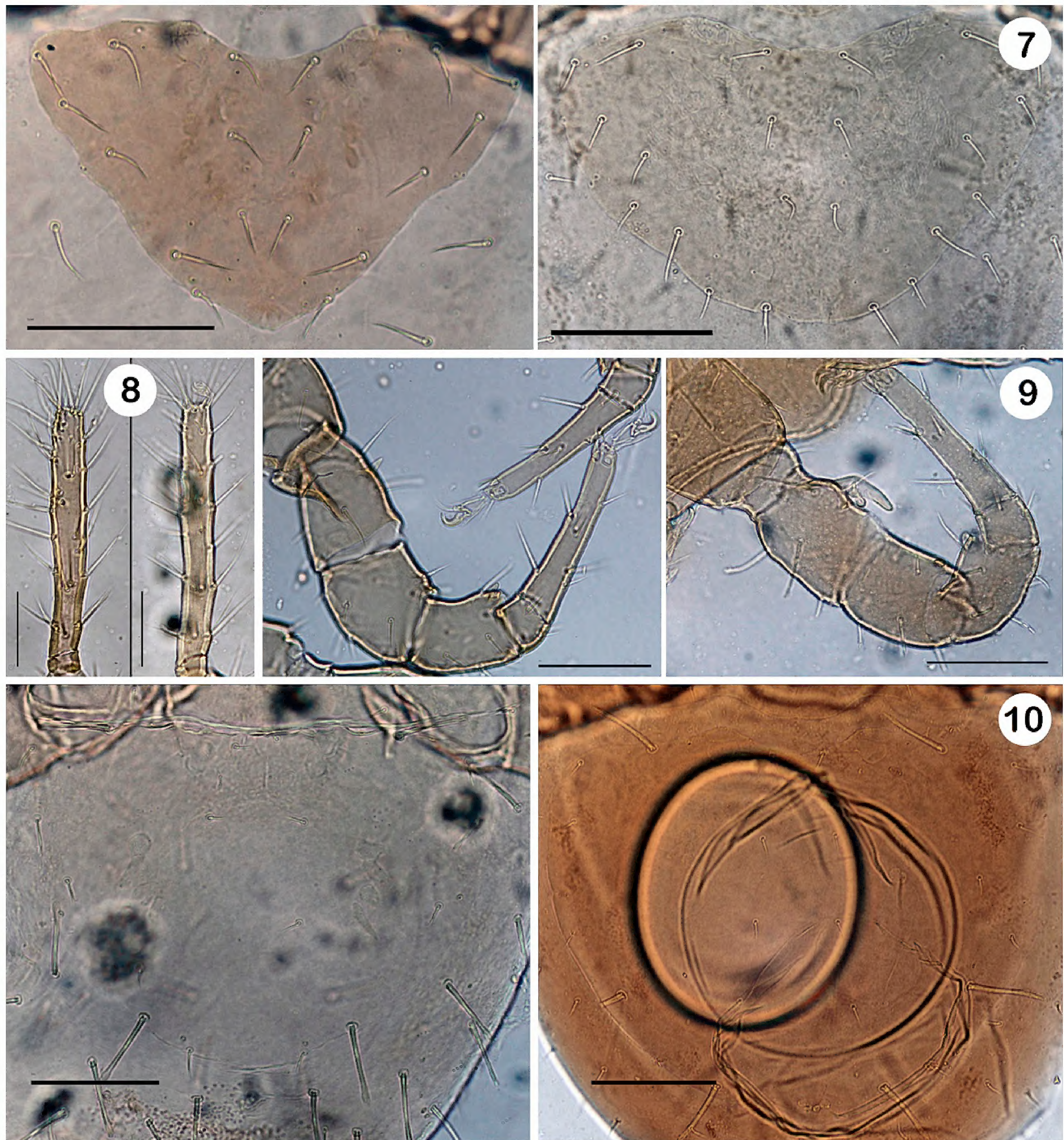
by Hyatt (1988), we cannot separate with certainty the deutonymphs.

Cornigamasus oculiferius is similar to and often misidentified with *C. lunaris*. We used the identification key provided by Witaliński (2014). The deutonymphs can be easily distinguished from other *Cornigamasus* species because they have only 9 pairs of setae on the opisthonotum (Fig. 7). The adults can be separated according to a lacking ambulacrum on tarsus I (Fig. 8). Males have only 1 small conical main spur on femur II (Fig. 9), and

the opisthonotum of females bear only 2 pairs of stout setae (Fig. 10).

Discussion

Parasitus americanus is a cosmopolitan species, found mainly in agricultural soils. Deutonymphs are frequently phoretic on beetles. It was described from Paraguay (Berlese 1905) and is widespread in South America (Athias-Henriot 1980, Postner 1953), USA (Morlan 1952),



Figures 7–10. A comparison of *C. ocliferius* on the left side of each figure and *C. lunaris* on the right. **7.** Opisthonotum of deutonymph. **8.** Tarsus I of female. **9.** Leg II of male. **10.** Opisthonotum of female. Scale bars: 100 µm.

Australia (Womersley 1943), South Africa (Athias-Henriot 1980, Karg 1972 as *Parasitus bituberosus* Karg, 1972, Halliday 2005), Israel (Costa 1961 as *P. fimetorum*, revision by Karg 1972), Iran (Kazemi et al. 2013), China (Lin et al. 2015), Mongolia (Athias-Henriot 1980), Russia (Petrova 1982), and in several European countries—Spain (Athias-Henriot 1980, Navarro-Campos et al. 2012), Germany (Karg 1972 as *P. bituberosus*), Ireland (Hyatt 1988), Bulgaria (Deltshev et al. 1998), and Hungary (Ripka and Szabó 2010).

Although some records are from leaf litter, fungi, dung, and under bark (Berlese 1905, Halliday 2005), most records are from agricultural soils (Womersley 1943, Karg 1972, Hyatt 1988). We found *P. americanus* in sev-

eral localities in Slovakia but most of our records are from soils and compost in urban environment: cemeteries and botanic garden. Despite intensive research of forest soils in Slovakia, we did not find a single specimen in this habitat. This is the first record of *P. americanus* from Slovakia.

Cornigamasus ocliferius was previously recorded only in Poland (Micherdziński 1969, Skorupski and Witaliński 1997, Witaliński et al. 2005, Witaliński 2014) and in Egypt (Negm 2016). Micherdziński (1969) described a female of *C. ocliferius* as *C. lunaris*. Karg (1993) mentioned 2 types of legs in *C. lunaris* and 1 of them together with a genital region of a female is characteristic for *C. ocliferius*, so the species is most likely also in Germany (Witaliński 2014). The type locality is in

the Pieniny Mountains in southern Poland, and only few kilometers from Slovakia, so we assume that this species is also in Slovakia; now we have confirmed it.

Skorupski and Witaliński (2014) stated that *C. ocliferius* is a very rare species and only a few specimens of both males and females are known. Despite that, we found a relatively large population of this species, and the revision of the material deposited at the Department of Zoology, Comenius University in Bratislava showed that *C. ocliferius* is not as rare as we assumed. Most of the records of *C. ocliferius* from Poland are from rotten hay, and only 1 record is from decaying litter and fodder of a rabbit (Witaliński 2014). However, we found this species in high abundance in a decomposed plant material and also in bird nests.

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Authors' Contributions

KH identified the specimen, KH and PF wrote the text and made the figures.

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